Science Progression – Disiplinary knowledge: Working Scientifically

Scientific Enquiry Types

 **Observing over time**	 **Pattern seeking**
 **Identifying, classifying and grouping**	 **Comparative and fair testing**
 **Research using secondary sources**	

EYFS Area of learning: **The Natural World**

2 Year Olds:	**3-4 Years:**	**Reception**
• Explore materials with different properties • Explore natural materials, indoors and outdoors.	• Use all their senses when exploring different materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see using a wide range of vocabulary. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the lifecycle of a plant or animal. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.	• Describe what they see, hear and feel whilst outside. • Understand the effects of changing seasons on the natural world around them. **Early Learning Goal** • **Explore the natural world around them, making observations and drawing pictures of animals and plants.** • **Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experience and what has been read in class.** • **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.**

	Questioning	Investigating	Results and conclusions
1	• I can ask a simple scientific question.	• I can begin to identify and classify things. • I can carry out simple tests with support. • I can begin to use simple equipment to make observations.	• I can begin to use simple data to answer questions.
2	• I can ask simple scientific questions.	• I can carry out simple tests. • I can identify and classify things. • I can use simple equipment to make observations.	• I can suggest what I have found out. • I can use simple data to answer questions.
3	• I can ask some relevant scientific questions. • I can make a prediction with some reasoning.	• I can make observations, including the use of standard units. • I can set up a simple enquiry to explore a given scientific question. • I can set up a fair test and begin to explain why it is fair. • I can use some equipment, including thermometers and data loggers to make measurements. • I can with support, set up a test to compare two things.	• I can begin to use observations and knowledge to answer scientific questions. • I can with help, gather, record, classify and present data in different ways, including oral and written explanations. • I can begin to draw conclusions and suggest some improvements. • I can identify some differences, similarities and changes related to an enquiry.
4	• I can ask relevant scientific questions. • I can make a prediction with a reason.	• I can make careful and accurate observations, including the use of standard units. • I can set up a simple enquiry to explore a scientific question. • I can set up a fair test and explain why it is fair. • I can use equipment, including thermometers and data loggers to make measurements. • I can set up a test to compare two things.	• I can use observations and knowledge to answer scientific questions. • I can gather, record, classify and present data in different ways, including oral and written explanations. • I can draw conclusions and suggest improvements. • I can identify differences, similarities and changes related to an enquiry.
5	• I can begin to relate the outcome from a simple enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.	• I can plan some different types of scientific enquiry. • I can begin to control variables in an enquiry. • I can begin to measure more accurately using a range of equipment.	• I can record data and results using some scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • I can begin to use the outcome of test results to make predictions and set up a further comparative fair test.

			• I can begin to report findings from enquiries in a range of ways. • I can explain some simple causal relationships in an enquiry. • I can begin to explain a conclusion from an enquiry.
6	• I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.	• I can plan different types of scientific enquiry. • I can control variables in an enquiry. • I can measure accurately and precisely using a range of equipment.	• I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • I can use the outcome of test results to make predictions and set up a further comparative fair test. • I can report findings from enquiries in a range of ways. • I can explain causal relationships in an enquiry. • I can explain a conclusion from an enquiry.

Science Progression – Substantive knowledge

EYFS Area of learning: **The Natural World**

2 Year Olds:	**3-4 Years:**	**Reception**
• Explore materials with different properties • Explore natural materials, indoors and outdoors.	• Use all their senses when exploring different materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see using a wide range of vocabulary. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the lifecycle of a plant or animal. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.	• Describe what they see, hear and feel whilst outside. • Understand the effects of changing seasons on the natural world around them. **Early Learning Goal** • **Explore the natural world around them, making observations and drawing pictures of animals and plants.** • **Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experience and what has been read in class.** • **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
To understand plants	• Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. • Identify and describe the basic structure of a variety of common flowering plants, including roots,	• Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	• Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.	*To revise what a range of flowering plants need to grow healthily and describe the functions of different parts: - roots, stem/trunk, leaves and flowers.*	*Relate knowledge of plants to studies of all living things*	*Relate knowledge of plants to studies of evolution and inheritance.*

	stem/trunk, leaves and flowers.		• Investigate the way in which water is transported within plants. • Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
To understand animals and humans	• Identify and name a variety of common animals including birds, fish, amphibians, reptiles and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (birds, fish, amphibians, Reptiles and mammals, including pets) • Identify, name, draw and label the basic parts of the human body and say which part is associated with each sense.	• Notice that animals, including humans, have offspring which grow into adults. • Investigate and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.	• Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. • Identify that humans and some animals have skeletons and muscles for support, protection and movement.	• Construct and interpret a variety of food chains, identifying producers, predators and prey. • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions.	• Describe the changes as humans develop to old age.	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions. • Describe the ways in which nutrients and water are transported within animals, including humans.

To investigate living things		• Explore and compare the differences between things that are living, dead and that have never been alive. • Identify that most living things live in habitats they suit and describe how different habitats provide for the basic needs of animals and plants and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including micro-habitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	*Revise simple food chains and microhabitats.*	• Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys. • Recognise that environments can change and that this can sometimes pose dangers to specific habitats.	• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • Describe the life process of reproduction in some plants and animals.	• Describe how living things are classified into broad groups according to common observable characteristics. • Give reasons for classifying plants and animals based on specific characteristics.
To understand evolution and inheritance	**N/A**	**N/A**	**N/A**	**N/A**	*Identify how animals and plants are suited to and adapt to their environment in different ways.*	• Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.

					Identify how plants and animals, including humans, resemble their parents in many features. *Make some links between fossils and the fact that living things have changed over time.*	• Recognise that living things have changed over time and that fossils provide information. About living things that inhabited the Earth millions of years ago. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
To investigate materials (including rocks and states of matter)	• Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. • Describe the simple physical properties of a variety of everyday materials.	• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.	**Rocks and soil:** • Compare and group together different kinds of rocks on the basis of their simple, physical properties. • Relate the simple physical properties of some rocks to their formation (igneous or sedimentary). • Describe in simple terms how fossils are formed when things that	**States of matter:** • Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when they are heated or cooled and measure the	• Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets.	*Revise all learning about changes in states and the suitability of different materials based on testing and understanding of different features.*

	• Compare and group together a variety of everyday materials on the basis of their simple physical properties.		have lived are trapped within sedimentary rock. • Recognise that soils are made from rocks and organic matter.	temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes.	

					• Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.	
To understand movement, forces and magnets	*Notice and describe how things move, using simple comparisons such as faster and slower.* **DT unit – moving parts (wheels and axels)*	*Compare how different things move.* **DT unit – moving parts (wheels and axels)*	• Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other,	**N/A**	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect.	**N/A**

			depending on which poles are facing.			
To understand light and seeing	**N/A**	**N/A**	• Recognise that they need light in order to see things and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by a solid object. • Find patterns in the way that the size of shadows change.	*Revise key knowledge about light sources, how shadows are formed and the dangers of the sun.*	*Revise key knowledge about how we see, how light travels and what materials cause reflections of light.*	• Understand that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • Explain that we see things because light travels from light sources to our eyes or from light sources to

						objects and then to our eyes.
To investigate sound and hearing	**N/A**	**N/A**	*Observe and name a variety of sources of sound, noticing that we hear with our ears.*	• Identify how sounds are made, associating some of them with something vibrating. • Recognise that vibrations from sounds travel through a medium to the ear. • Find patterns between the pitch of a sound and features of the object that produced it. • Find patterns between the volume of a sound and the strength of the vibrations that produced it. • Recognise that sounds get fainter as the distance from the sound source increases.	**N/A**	**N/A**

To understand electrical circuits	**N/A** **N/A**	**N/A**	*Identify common appliances that run on electricity.* *Construct a simple series circuit, identifying and naming the key components.*	• Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • Identify if a lamp will light in a simple series circuit, based on if the lamp is part of a complete loop with a battery. • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and	*Revise key knowledge of electrical circuits and electrical safety.*	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram.

				insulators, and associate metals with being good conductors.		
To understand the Earth's movement in space (& Seasonal Changes)	• Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.	*Observe changes across the four seasons.* *Observe and describe weather associated with the seasons and how day length varies.*	**N/A**	**N/A**	• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	*Revise key knowledge about Space.*
Content in green italics is not statutory content but describes opportunities for revision or links previous/subsequently made regarding a topic.						